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SCIENCE

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FRIDAY, DECEMBER 14, 1900.

ANNUAL REPORT OF THE SECRETARY OF AGRICULTURE FOR 1900.

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MSS. intended for publication and books, etc., intended for review should be sent to the responsible editor, Professor J. McKeen Cattell, Garrison-on-Hudson, N. Y.

SECRETARY WILSON begins his report with a complimentary reference to the work of his predecessors which has brought the Department of Agriculture to its present state of efficiency. He declares his own aims to bring the Department scientists to the help of the producers, to ascertain what we import that they can produce, with a view to encouraging its growth; to search the world for grains, fruits, grasses and legumes, that they may be domesticated here and be an improvement on what we have; to secure new and improved varieties of plants by cross-fertilization; to cooperate with the experiment stations in all the States and Territories in research of practical value to the people of all sections; and to seek out new markets for our surplus products.

Mr. Wilson emphasizes the manner in which this Department differs from others. He says its appropriations should be regarded as an investment, for the reason that it makes direct returns therefor by adding to the wealth of the country, thus adding yearly largely to the profits of the farmers and others as the result of its investigations. He instances as money-saving or money-making agencies the Weather Bureau; the meat inspection; the pathological investigations of plants; the services of the entomologist; the services of the

Department on behalf of sugar and tea industries, of the orange industry, which owes its beginning and its preservation to this Department, of the tobacco industry, and others.

Then taking up the work of the Department in more detail, he reviews the operations of its several branches.

WEATHER BUREAU.

Important extensions of the Weather Bureau work have been made during the past year. Its efforts were specially directed to investigate methods of electrical communication without wires, with a view to establishing wireless electrical communication between vessels at sea and exposed points on our lake and sea coast. New appliances have been devised and receivers constructed more delicate than any heretofore made. Already messages have been successfully transmitted and received over 60 miles of land presenting a rough and irregular surface, and it is believed that the efficiency thus indicated would operate successfully over several hundred miles of water. This matter, says the Secretary, is of such importance to commerce that he has authorized further extensive experiments, and he expresses the hope that in the near future the craft employed in our coastwise commerce and on the Great Lakes will be placed in instantaneous communication with the stations of the Weather Bureau located at the principal ports.

Special storm forecasts for the North Atlantic will be undertaken shortly through the use of reports received from the West Indies, the Bahamas, Bermuda, the Azores, and Portugal, the new cable system connecting Lisbon with New York via the Azores making this possible. Much stress is laid upon the continued improvement of the forecast service and the value of its warnings. He points out that, notwithstanding the great number of craft plying the Gulf

of Mexico at the time of the Galveston storm, the warnings were so timely that there was no disaster upon the open waters.

BUREAU OF ANIMAL INDUSTRY.

The number of abattoirs and packing-houses receiving the benefit of inspection was 148 in 45 localities, as against 138 in 41 localities the preceding year. The total ante-mortem inspections of cattle aggregated 53,087,994; animals rejected, subject to post-mortem, at abattoirs, 5,928; and in stock yards, 153,561. The total post-mortem inspections were 34,737,613, and the total carcasses condemned, 61,906. In the microscopic inspection of pork 999,554 carcasses were examined. Of these but 19,448, or 1.95 per cent., were found to contain living trichinæ. The total cost of inspection was but a few dollars over \$700,000. Of vessels inspected by officers of the Bureau, 862 received clearances. Of the cattle shipped across the Atlantic, the loss amounted to but .24 per cent.; of sheep, .71 per cent., and of horses, 2.55 per cent. It is interesting to note the great increase in the number of horses exported. Of these, over 29,000 were landed from American ports at London, Liverpool and Glasgow.

During the quarantine season of 1899 over a million cattle were moved under the supervision of the Bureau from the district infected with the Southern cattle tick. In Texas alone, over 357,000 cattle were inspected for shipment to other sections. The sheep industry has suffered greatly from sheep scab, and much time and attention have been given to securing its control and eradication. Results so far are encouraging, and the Secretary believes that a few more years of earnest work will effectually eradicate the disease. Over 1,800,000 sheep were inspected, and nearly 627,000 dipped under the supervision of the inspectors.

The work of preparing serum for treating

hog cholera and swine plague, and experiments in treatment therewith, are continued, with results which, while they do not justify definite conclusions as yet, are sufficiently encouraging to justify continued experiments, including some on entirely new lines. Over one million doses of blackleg vaccine have been distributed during the year. Summarized reports of 2,000 cattle owners testify to its efficiency. Whereas a loss of 10 to 25 per cent. of young stock is reported in the districts where blackleg prevails, the loss where vaccination has been tried has been less than one-half of one per cent. From two to two and a half million doses will be required to supply the demand during the current fiscal year. The Bureau has already distributed 10,722 doses of mallein for testing horses for glanders, and 33,400 doses of tuberculin. Considerable space is given to the consideration of tuberculosis, 'the most prevalent and most destructive disease affecting mankind and the domesticated animals.' A great increase in the disease is noted in the principal countries of Europe, especially, unfortunately, in those whence American breeders desire to obtain animals for improving their stock. Arrangements have been made to station an inspector in Great Britain to test and certify to the animals before shipment. The suggestion is made that uniform regulations under Federal authority will save shippers much annoyance and loss, owing to the numerous restrictions imposed by individual States, and at the same time furnish adequate protection.

With regard to rabies the Secretary declares that this disease is unfortunately on the increase in the United States, and that local authorities have in most cases not efficiently controlled its outbreaks. He refers especially to its existence and increase in the District of Columbia, and points out the special danger to children

from rabid dogs. Owing to the very serious expense to families in moderate circumstances in subjecting their children to the Pasteur treatment, he recommends either that the Secretary of Agriculture be authorized to pay for such treatment for parties bitten in the District, or that one of the medical services of the government be directed to furnish such treatment free of charge.

The report states that ticks received from Porto Rico have been found identical with the well-known Southern cattle tick. The main problem still presented by the Texas fever question is the finding of a dip that will effectually destroy the tick without injuring the cattle. Efforts in this direction are to be continued.

Experimental shipments of dairy products are still continued, and shipments of butter have been extended to Cuba and Porto Rico. The Department is seeking to obtain information useful to butter exporters in canning butter and producing butter especially adapted to shipment to warm countries. Some countries sending butter to these markets show a disposition to adapt their products to the needs of those countries, which is an example our producers must follow if they are to compete successfully with them. The Secretary earnestly recommends an inspection of dairy products designed for export. He points out the example of other countries, whose large foreign trade in dairy products has been principally developed owing to the fact that their best products bear a Government stamp, guaranteeing the article to be as represented.

DIVISION OF CHEMISTRY.

Elaborate work in the investigation of food adulteration has been continued. Over 500 samples of preserved meats of all kinds, purchased in open market, have been examined. The meat of the horse has been

examined for the discovery of a method whereby it may be detected when sold under another name. Very little of it seems to be sold in the United States, whether under its own name or any other name. Active cooperation has been had with other bodies, notably the Pure Food Congress, in an effort to secure legislation on the subject of food adulterations. National legislation on the subject is urged as essential to supplement and make efficient the work done in the several States. The sugar-beet work has been prosecuted with vigor and intelligence. Foreign food products introduced into this country have been the subject of careful study. The results are confidential and are used for the information of the authorities of this country controlling imported food products. Cooperation of the chief chemist has been invited in several other directions and always cheerfully extended. So, also, there has been cooperation with the other divisions of the Department where chemical work has been necessary.

DIVISION OF ENTOMOLOGY.

Most satisfactory reports are received from California as the result of the entomological work in the introduction of the insect which fertilizes the Smyrna fig. In one locality more than six tons of Smyrna figs have been produced. The result will be to make America a grand competitor in the fig trade of the world's markets. An important parasite has been introduced to prey upon the olive scale, so injurious to the olive growers of California. From Natal a fungous disease has been introduced by which injurious swarms of locusts have been destroyed. Efforts have been made to introduce European parasites of the gypsy moth.

DIVISION OF BOTANY.

The results of seed testing are declared to be satisfactory and to have greatly im-

proved the quality of the seed distribution by Congress. Further improvement, however, is necessary in purity of stock or trueness to name. As the new seeds and plants introduced from foreign countries demonstrate their adaptability, they will become available for Congressional distribution. Experts of the Division had been studying plants poisonous to stock in Montana, and a report on the subject will be soon forthcoming. Valuable experiments will be conducted upon the ground set aside for the use of the Department on the Potomac Flats at Washington. Especial attention is called to experiments with American clover seed, which have shown that the American seeds are decidedly more valuable than the European.

SECTION OF SEED AND PLANT INTRODUCTION.

Seed and plant introduction receives extensive notice, special stress being laid upon the importations of cereals, including the macaroni wheats of Southern Europe, of grasses and forage plants and of vegetables which have already demonstrated their value. The Kiushu rice introduced from Japan has already added 1,000,000 bushels annually to the Louisiana rice crop. The successful introduction of date trees in Arizona is another valuable achievement. In concluding this subject Secretary Wilson cites the introduction of wheats from Russia, Hungary and Austria, greatly exceeding in yield our present varieties, and points out that if, as the result of these introductions, the wheat yield of the United States should be increased by but one bushel per acre, this would mean at the farm price for wheat in 1899, an addition of \$26,000,000 to the income of our farmers.

DIVISION OF VEGETABLE PHYSIOLOGY AND PATHOLOGY.

This work is now divided into five important branches, namely, plant pathology,

plant physiology, Pacific coast investigations, plant breeding and plant nutrition and fermentation. The Secretary believes that excellent results will be obtained from the systematization of the work of this Division. In plant breeding orange hybrids have been placed at various points in the South, and their value has been tested in cooperation with several experiment stations. In corn breeding the features aimed at are early maturity, drought and smut resistance, increased protein content, and a large yield. Diseases of the sugar beet have been investigated, also diseases of forest trees. The transfer of Mr. B. T. Galloway as chief to the Directorship of Plant Industry, and the succession to the chiefship of Mr. A. F. Woods are noted.

DIVISION OF POMOLOGY.

The most important work of the year in this line was the establishing and maintaining at the Paris Exposition of an exhibit of horticultural implements, seeds, plants and fruits. This exhibit attracted wide attention, and the Secretary believes its ultimate effect will be most beneficial to American producers. No other country, it seems, attempted to maintain a continuous fresh-fruit exhibit. A special effort has been made to give a thorough test to the cultivation of choice European grapes in the South Atlantic States.

DIVISION OF AGROSTOLOGY.

This work has also been divided into several sections and thoroughly systematized. As a result of experiments in Texas, the grazing of pastures has been so much improved that, where three years ago they were estimated as capable of supporting one steer to 16 acres, they will now maintain in good condition one steer to 8 acres, a gain of 100 per cent. Among the objects of cooperative effort are the following: Range improvement, formation and man-

agement of meadows and pastures, forage plants for alkali soils, soiling crops, winter pasturage, etc. Particular attention has been devoted to collecting seeds, roots, and plants of notable native grasses. The grass garden on the Department grounds, containing nearly 500 varieties, has been maintained, and seeds of some 200 varieties have been distributed.

DIVISION OF GARDENS AND GROUNDS.

The Secretary refers in most complimentary terms to the late Mr. Saunders, so many years in charge of this and other important branches of the Department work, and reports the transfer of the experimental gardens and grounds, since Mr. Saunders's death, to the control of Mr. B. T. Galloway. Considerable space is given to tea production in the United States and to the opportunity this industry affords of utilizing the labor of colored children in the South, while at the same time affording them a good education. The claim is made that it has been demonstrated that tea can be produced in the United States for family use in gardens and also on a commercial scale. It has been shown that a good grade of tea can be produced for 15 cents a pound, or about \$60 per acre, counting an average yield 400 pounds. Such tea should sell for at least 30 cents. In future special attention will be given to the manufacture of green tea.

BIOLOGICAL SURVEY.

The destruction of prairie dogs has become a practical question of great interest to farmers, and is being investigated by the Department. Warning is given of the possible danger of the introduction and dissemination of the Belgian hare. It is reported by the State Board of Horticulture in California that several thousands of these animals are now at large throughout the State, and their rapid multiplication will make them a source of great injury. Lab-

oratory work and study of the food of birds of economic importance have received attention. Special note is made of the Lacey Act, by which the Secretary of Agriculture is charged with the supervision of the importation of birds contemplated by this Act of Congress. Congress has authorized the Secretary to adopt such measures as necessary to carry out the purposes of the Act; and it is urged that the present appropriation being inadequate for the purpose, an increase should be provided.

SOIL SURVEY.

This work has been greatly extended, but still falls far short of meeting the demand for soil surveying from all sections of the country. For this reason a considerable increase has been asked for. Letters and resolutions endorsing the work and urging its extension as one of great practical value have been received from many individuals and organizations. Owing to its costliness, and the widespread demand for it, the Secretary recommends that Congress provide for the printing of the annual report of this Division, as is now done with the annual reports of the Weather Bureau and Bureau of Animal Industry.

The Secretary feels highly encouraged by the results of the work of this Division with tobacco. He notes especially the successful results of an attempt to grow the Sumatra leaf in Connecticut. Sumatra tobacco imported costs our consumers, with the duty, \$15,000,000. Of this \$6,000,000 goes to foreign producers. He believes that in a short time this will be saved for our own tobacco growers. The tobacco exhibit at the Paris Exposition was one of the largest as well as the most complete ever made. It contained over 2,000 samples. The Florida-grown Sumatra was awarded 20 points of merit against 18 points for Sumatra, and the bright yellow of North Carolina was awarded as many points as

the Turkish tobacco with which it competes.

FORESTRY WORK.

There has been a great growth in this work, which is of such a kind as to fully justify additional resources. Moreover, there has been an enormous increase in the demand, both public and private, for services of this character throughout the country. The relations of the Division of Forestry with practical lumbermen and tree planters have been closer and more useful than ever before. The total membership of the force at the highest last summer was 125. The public interest in forest matters is not only keener and wider than at any time before, but it is growing with rapidity beyond precedent. Cooperation in forest work has been sought of this Department by the Secretary of the Interior in reference to the national forest reserves, and from the Forest, Fish, and Game Commission of New York, for working plans for the New York State Forest Preserves. The total requests for working plans at the close of the year exceeded 50,000,000 acres, of which two and a half millions were private land. Personal examinations were made of 48 tracts in 14 States, covering nearly 900,000 acres, plans were actually prepared for 200,000 acres, and 50,000 acres were put under management. Tree-planting plans were made for 59 applicants.

The department is receiving with increased frequency applications for planting and working plans for watersheds from which cities obtain their supplies. A typical instance is that of the Water Company of Johnstown, Pennsylvania, one of the chief objects being to prevent a recurrence of the disaster there.

Studies of commercial trees, with a view to ascertaining rate of growth and production and other facts germane to the best practical forestry, were considerably extended.

PUBLIC ROAD INQUIRIES.

There is much inquiry in all sections of the United States regarding better roads and better methods of building them. It has been deemed wise to divide the country into four sections, and to appoint in each an expert agent. This has been done, and one appointed in the Eastern States, one in the Southern, one in the prairie States, and another in the Rocky Mountain States. These gentlemen are to study the needs of these several sections, give instruction as to road building, and report regularly to the Department. They will, moreover, supply samples of road material for analysis and testing, a testing machine having been arranged for in the laboratory of the Division of Chemistry, to be operated by an expert under the joint supervision of the director of road inquiry and the chief chemist.

Much work has been done in the past year in cooperating with the colleges and stations and the people of the several States in building experimental roads, and generous acknowledgment is made of the services contributed to the cause of good roads by the various transportation companies throughout the country.

OFFICE OF EXPERIMENT STATIONS.

The Secretary reviews at considerable length the work of the experiment stations first established in this country twenty-five years ago. Until 1887, the date of the Hatch Act, stations had been established in only fourteen States. Under this Act the enterprise was extended to cover the entire country, and the great success which, on the whole, has attended the establishment of the stations in all the States and Territories is very remarkable. Including the \$720,000 received from the National Government, the total revenues of the stations during the year amounted to \$1,200,000. The stations now employ nearly 700

persons, and in 1899 their publications aggregated 445 reports and bulletins.

The Secretary advocates a more complete separation of the business of the station from the general business of the college, and, where possible, the appointment of a director of the station as a separate officer. He believes it to be a mistake, on the whole, to divert the time and energy of competent investigators to the routine work of inspection service. While the Department of Agriculture is by law organized as an administrative agency as well as a great scientific institution, the stations, on the other hand, are organized solely to carry on investigations for the benefit of agriculture.

Cooperative enterprises between the Department and the stations have increased in number, and also in scope and variety. Both the officers of the Department and of the stations are greatly interested in co-operation, which, it is believed, may be systematized and greatly extended, thus adding much to the efficiency of both the Department and the stations.

Progress is noted in the experiments conducted in Alaska, and the establishment of substations is recorded. It is admitted that Alaska can never become an agricultural country, but the problem the Department has undertaken to work out is to determine whether a sufficient agriculture may be developed in Alaska to form an important subsidiary industry to aid in the development of mining, fisheries and lumbering. It has already been shown that green vegetables raised in Alaska have been an important factor in maintaining the health of mining communities. There are large areas on the western peninsula and the islands naturally adapted to live stock. For a considerable period the Department's operations in this Territory will partake of the nature of an agricultural survey to determine where agricultural operations may be best carried on. The

Secretary makes a comparison of Alaska with Finland, which supports a population of 2,500,000 souls, and which produced in 1895 nearly 40,000,000 bushels of cereals, besides exporting nearly \$7,000,000 worth of dairy products.

As the result of investigations in Hawaii and Porto Rico, the Secretary believes that experiment stations should be established in these dependencies, and that they should receive for this work an annual appropriation equal to that given to the other Territories.

Investigations on the food and nutrition of man have been continued, largely in cooperation with the stations and colleges. This subject is one touching every household, numerous public institutions and the army and navy, and the results obtained can be made of great practical value. Household economics is rapidly taking its place among the required studies of our institutions of learning.

Much consideration is given in the report to the irrigation investigations, which in accordance with the terms of the appropriation act, cover especially two general lines of investigation, namely, the study of the laws and institutions relating to irrigation in different regions, and secondly, the determination of the actual use made of irrigation waters.

Eight typical streams in different parts of California have been thoroughly studied with reference to the conditions under which the water for irrigation is owned, distributed, and used. Similar investigations on a smaller scale have been made in Utah, Colorado, and elsewhere. Interest in the use of irrigation to supplement rainfall in the humid regions is growing, and valuable investigations have been made in New Jersey and have also been undertaken in Missouri and Wisconsin in cooperation with the experiment stations in those States.

The Secretary calls attention to the fact

that on the supply of water for irrigation and its equitable distribution depends the permanent existence of civilized life in one-third of the area of the Union. Throughout this vast region questions relating to irrigation are vital to the ultimate solution of its problems, and must be found not only in State legislation, but in the action of the National Government. Most of the streams used for irrigation cross State lines, while some run partly in foreign countries. What is needed in this matter at the present time above everything else is the impartial ascertaining and recording of the facts relating to irrigation in this country. It is this task which the Department has set for itself.

SECTION OF FOREIGN MARKETS.

The study of markets abroad with special reference to extending the demands therein for the agricultural products of the United States has been prosecuted with zeal and intelligence. From the records of this section we derive most satisfactory information as to the development of our agricultural exports. While it is true that these bear a somewhat smaller proportion to the total exports than formerly, nevertheless the actual increase is very great. During the fiscal years 1897-1900 our total sales of domestic farm products to foreign countries aggregated the enormous sum of \$3,186,000,000, an excess of \$800,000,000 over the preceding four-year period. The agricultural exports of the United States for the past fiscal year amounted to \$844,000,000. The rapid growth of our export trade to the Orient in recent years is most striking. Five years ago our total shipments of domestic merchandise to Asia and Oceania were valued at \$43,000,000, of which only \$9,700,000 were agricultural. There has been a steady increase in each succeeding year, until in 1900 our export trade with the Orient amounted to \$107,000,000, of

which \$30,000,000 worth was farm produce. Of this great increase in the growth of our agricultural exports to that quarter of the globe, amounting to something over \$20,000,000, \$11,500,000 consisted of cotton, and \$3,400,000 of wheat flour.

During the past fiscal year Cuba, Porto Rico, the Hawaiian Islands and the Philippines furnished a market for \$45,000,000 worth of our domestic products. Five years ago these islands took but \$13,000,000 worth. During the fiscal year 1900 we sold to these islands \$20,000,000 worth of farm produce, an increase of \$13,700,000 over 1896.

DIVISION OF STATISTICS.

Efforts in this Division have been mainly directed to strengthening and improving the Department's several crop-reporting agencies. Two statistical field agents now devote their entire time to systematic visitation of the principal centers of agricultural industry. Much good is derived from their efforts. At the same time it is gratifying to state that the reports from the Department's regular correspondents have never before been so numerous, complete and prompt.

DIVISION OF PUBLICATIONS.

The Secretary notes with gratification that appreciation of the Department's work, as manifested in the demand for its publications, is every year more evident; so that with an annual output exceeding in the aggregate 7,000,000 copies, refusals to applicants are in many cases imperative. The number of new publications issued during the fiscal year was 320, against 297 for 1899; of reprints there were but 148 in 1900, against 306 in 1899; of Farmers' Bulletins 108 were issued, aggregating 2,360,000 copies. Even this enormous number fails to meet the requirements of Congress, which in this year's appropriations has provided for a still larger issue, and has

reserved for the use of Senators, Representatives and Delegates four-fifths of the number printed, in lieu of two-thirds, as heretofore. The calls upon this Division from all parts of the country for publications, involved replies to 300,000 separate communications during the year, besides which more than 3,300,000 names and addresses had to be written in the distribution of documents.

THE LIBRARY.

Five thousand volumes have been added to the Library during the year, and cards have been issued to nearly 4,000 libraries, containing entries of all articles in the Yearbooks and Farmers' Bulletins issued to date.

ACCOUNTS AND DISBURSEMENTS.

Appropriations for the Department for the fiscal year ended June 30, 1900, amounted to \$3,006,022, an excess over 1899 of \$176,320. In addition, the usual sum of \$720,000 was provided for division among the State agricultural stations. Expenditures and liabilities incurred during the year were \$2,975,000. During the year \$4,440 was paid for the rental of leased buildings in Washington.

PARIS EXPOSITION AWARDS.

The final official list of the Paris Exposition awards has not yet reached the Department, but preliminary reports supplied by its representatives in Paris record about 500 awards to United States exhibitors in agricultural, horticultural and food products. The United States was also generously considered in the forestry and tobacco classes.

AFFILIATION OF ALLIED LINES OF WORK.

The Secretary lays particular stress upon the necessity of adopting from this time forward a policy of aggregation rather than segregation in the development of the Department work, so as to bring together the

related lines of work without, however, interfering in any way with the integrity of the organization of these several Divisions. He reports the affiliation in this manner of four important Divisions closely allied by the nature of their work under the name of the Office of Plant Industry.

LABORATORY BUILDINGS.

An urgent recommendation is made for the erection of new, fireproof laboratory buildings, which, it is estimated, will cost about \$200,000.

DIFFICULTY OF RETAINING EXPERTS.

One of the problems constantly recurring to the head of the Department is the difficulty of retaining in the service some of the most capable and efficient of its workers. During the past year three valuable workers were lost to the Department, and other losses are threatened, owing to the tempting offers made to Department experts from other sources. The Secretary recommends that Congress place it in his power to exercise a wider discretion in the matter of salaries to responsible officers.

ARLINGTON FARM.

Under the authority of Congress work has been begun on the Arlington estate with a view to establishing an experimental farm on the land set apart for the use of the Department.

DOMESTIC SILK CULTURE.

In 1899 the United States paid over \$32,000,000 for imported raw silk, and in 1900 over \$45,000,000. The Secretary believes that a large amount of cheap and now unemployed labor among the colored youth in the Southern States could be made available for domestic silk culture; and he desires an appropriation of \$10,000 to set on foot research regarding the production of silk, to the end that the money now paid to foreign labor be distributed at home.

STANDARD METHODS OF WATER ANALYSIS.*

As its first report of progress, the Committee on Standard Methods of Water Analysis presents the results of a careful inquiry into the present status of this general subject. This step was deemed necessary in order to bring to the Committee needed information for its guidance in its future plans of action.

About 125 copies of a circular letter, with an accompanying list of questions, were sent to leading workers. The number of detailed replies was fewer than should have been the case. Nevertheless, these replies, with the knowledge which the members of this Committee have as to the methods used in the more prominent laboratories, enable us to present a substantially correct *résumé* of existing conditions, as given in the following pages.

Collection of Samples.—Upon the subject of collection of samples the replies to the question sent to various workers were practically unanimous, and may be summarized as follows:

Bottles for chemical samples should have a capacity of one gallon, should be made of clear white glass in order to facilitate inspection, and should have glass stoppers. They should be washed each time before use with sulphuric acid and potassium bichromate, or with alkaline permanganate, followed by sulphuric acid; they should then be thoroughly rinsed and drained. For shipment the stoppers and necks of the bottles should be protected with cloth tied over them. They should be packed in cases with separate compartments for each bottle, and lined with indented fiber paper, felt or some similar substance, or provided with

* Report presented at the Indianapolis meeting of the American Public Health Association by a committee comprising Mr. George W. Fuller, chairman; Mr. George C. Whipple, secretary; Mr. Harry W. Clark, Dr. Adolph Gehrmann, Dr. Wyatt Johnston, Dr. E. O. Jordan and Dr. H. L. Russell.